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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ROBERTS, BRIAN S	

ART UNIT	PAPER NUMBER
2662	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/922,486	SUBRAMANIAN ET AL.	
	Examiner	Art Unit	
	Brian Roberts	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

- Applicant's Amendment filed 6/29/2005 is acknowledged.
- Claims 1-37 have been examined.
- Claims 17-37 have been added.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 12, 15, 17, 28, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273)

- In reference to claim 1, 17, 33

Mobin et al. teaches in Figure 1A a receiver and method that comprises of:

- An A/D converter (62) that inherently contains a sampler (a sampler for sampling a TDMA signal received from a transmission channel)
- An adaptive frequency correction rotation subunit (32) (a derotator for correcting for frequency offset in the sampled TDMA signal)
- An equalizer (34) (an equalizer to which is applied an output signal from the matched filter)
- A deinterleaver (36) (a deinterleaver to deinterleave the received TDMA signal)

- A channel decoder (42) (a channel decoder for decoding the received TDMA signal after it is deinterleaved)

Mobin et al. does not teach a matched filter for correcting for the response of the transmission channel in the received TDMA signal.

In Figure 10, Webster et al. teaches a channel matched filter (33) for correcting the response of the transmission channel in the received signal.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify a receiver as taught by Mobin et al. to include a channel match filter as taught by Webster et al. whose output is applied to the equalizer in order to maximize the signal to noise ratio and correct for the response of the transmission channel on the received signal.

- In reference to claim 12, 28

The combination of Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

Mobin et al. teaches an automatic frequency correction unit (58) that provides a feedback signal to the frequency correction rotation sub-unit (32) in order to adjust the phase of incoming signals substantially reduce communication errors. (column 6 lines 26-40, Figure 1A) (frequency offset estimator for estimating frequency offset and adjusting the derotator to response to such an estimate)

- In reference to claim 15, 31

The combination of Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

Mobin et al. further teaches the design choice of a cyclic decoder (72) and a speech decoder (74) for decoding the output signal from the channel decoder (42). (Figure 1, column 6 lines 12-20) (a block decoder for decoding an output signal from the channel decoder)

Claims 10 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims, and further in view of Wright et al. (US 5309482)

- In reference to claim 10, 26

The combination Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

Mobin et al. does not teach a channel impulse response estimator.

In Figure 10, Webster et al. teaches a channel impulse response estimator (107).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify a receiver as taught by Mobin et al. to include a channel impulse response estimator as taught by Webster et al. in order to estimate the response of the transmission channel.

The combination Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

The combination Mobin et al. and Webster et al. do not teach updating the coefficients of the matched filter.

In Figure 2, Wright et al. teaches a coefficient generator (80) to update the coefficients of a match filter.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify a receiver of the combination of Mobin et al. and Webster et al. to include a coefficient generator (80) as taught by Wright et al. with the channel impulse response estimator to update the coefficients of the matched filter in order to improve the signal to noise ratio and to minimize the size of the receiver by combining the functions of the coefficient generator with the channel impulse response estimator.

3. Claims 11 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims, and further in view of Wright et al. (US 5309482) and in further view of Parr et al. (US 5263026)

- In reference to claim 11 and 27

The combination of Mobin et al., Webster et al., and Wright et al. teach a receiver that covers substantially all limitations of the parent claims.

The combination of Mobin et al., Webster et al., and Wright et al. do not teach a delay-epoch estimator for controlling the sampler in response to an input from the channel impulse response estimator.

In Figure 2, Parr et al. teaches a Bit Timing Control (37) (delay-epoch estimator) that receives input from a channel impulse response estimator via (32) for controlling the A/D converter that samples the received signal. (column 4 lines 65-67)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify a receiver Mobin et al., Webster et al., and Wright et al. to include a Bit Timing Control that provides a control signal to the A/D converter in order to control the symbol sampling of the received signal.

4. Claims 2, 4, 7-9, 18, 20, 23-25, 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims, and further in view of Cahill. (US 5150384)

- In reference to claims 2, 4, 18, 20, and 34

The combination of Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

The combination of Mobin et al. and Webster et al. do not teach a filter for filtering the received TDMA signal before the sampler samples it.

Cahill teaches a matched filter (137) in a communications receiver that is used for pulse shaping the received signal (a matched filter for pulse shaping the received TDMA signal) before the sampler samples it. (column 8 lines 10-18, Figure 1) (a filter for filtering the received TDMA signal before it is sampled by the sampler)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the receiver as taught by the combination of Mobin et al. and

Webster et al. to include a match filter that filters the received signal before it is sampled by the sampler as taught by Cahill in order to maximize the signal to noise ratio of the signal before sampling it.

- In reference to claim 7-9, 23-25, 36

The combination of Mobin et al. and Webster et al. teach a receiver that covers substantially all limitations of the parent claims.

Mobin et al. and Webster et al. do not teach a scaler, automatic gain control circuit for controlling the scaler, or estimator for determining the received signal strength and providing an estimate of received signal strength to the automatic gain control circuit.

Cahill teaches an adjustable gain preamplifier (105) (scaler for adjusting the magnitude of the received TDMA signal) that receives feedback from a energy estimator (205) (automatic gain control circuit for controlling the scaler) based on the energy level of the received signal (column 8 lines 64-68. column 9 lines 1-17, Figures 1-2) (estimator for determining the received signal strength and providing an estimate of received signal strength to the automatic gain control circuit)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the receiver as taught by the combination of the combination of Mobin et al. and Webster et al. to include an adjustable gain preamplifier that receives feedback from the energy estimator based on the energy level of the received level as taught by Cahill in order to control clipping and severe distortion of the received signal.

5. Claims 13-14, 29-30, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims and further in view of Toskala et al. (US 6269126)

- In reference to claim 13-14, 29-30, 37

The combination of Mobin et al. and Webster et al. teaches a receiver that covers substantially all limitations of the claims.

The combination of Mobin et al. and Webster et al. do not teach a received signal quality metric indicator for measuring the signal quality of the received TDMA signal and using it to condition an output from the channel decoder.

In Figure 3, Toskala et al. teaches a block (372) for measuring the signal quality where the output is a control channel that provides feedback to condition the control block (318) and ultimately the decoder (354). (column 4 lines 46-52)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify the combination of Mobin et al and Webster et al. to include a block to measure the signal quality and using the output to condition the decoder as taught by Toskala et al. because it allows adjustment of the symbol rate if the received signals does not meet or dramatically exceeds the quality requirements of the receiver.

6. Claims 2-3, 18-19, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims, and further in view of Sato. (US 5982763)

- In reference to claim 2-3, 18-19, 34

The combination of Mobin et al. and Webster et al. teaches a receiver that covers substantially all limitations of these claims.

The combination of Mobin et al. and Webster et al. do not teach an interpolation filter for up sampling the received signal.

Sato teaches an interpolation filter (103) used to re-sample the signal at a frequency higher than the sampling frequency of the A/D converter. (Figure 1, abstract, column 5 lines 56-62) (interpolation filter for up sampling the received TDMA signal).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to further modify the combination of Mobin et al and Webster et al. to include an interpolation filter as taught by Sato in order to re-sample the signal at a frequency higher than the sampling frequency of the A/D converter. This allows samples to be generated in between those actually sampled by the A/D converter and allows the interpolator to adjust the effective sampling frequency and phase of the signal.

7. Claims 16 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. in view of Webster et al., as applied to the parent claims, and further in view of Cahill and in further view of Kang.

- In reference to claim 16, 32

Mobin et al. teaches in Figure 1A a receiver that comprises of:

- An A/D converter (62) that inherently contains a sampler (a sampler for sampling a TDMA signal received from a transmission channel)
- An adaptive frequency correction rotation subunit (32) receiving input from the A/D converter (a derotator)
- An equalizer (34) (an equalizer)
- A deinterleaver (36) to which a output signal is applied from the equalizer (a deinterleaver to which is applied an output signal from the equalizer)
- A channel decoder (42) to which is applied an output signal from the deinterleaver (a channel decoder to which is applied an output signal from the deinterleaver)
- A cyclic decoder (72) and a speech decoder (74) for decoding an output signal from the channel decoder (42). (Figure 1) (a block decoder for decoding an output signal from the channel decoder)

Mobin et al. does not a matched filter whose output is applied to the equalizer.

In Figure 10, Webster et al. teaches a channel matched filter (33) for correcting the response of the transmission channel in the received signal.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify a receiver as taught by Mobin et al. to include a channel match filter as taught by Webster et al. whose output is applied to the equalizer in order to maximize the signal to noise ratio and correct for the response of the transmission channel on the received signal.

The combination of Mobin et al. and Webster et al. teaches a receiver that covers substantially all limitations of the claim.

The combination of Mobin et al. and Webster et al. does not teach a TDMA communications receiver with a pulse shaping matched filter whose output is received by a sample selector and a scaler receiving input from the adaptive frequency correction subunit.

In Figure 1, Cahill teaches a TDMA communications receiver comprising:

- A matched filter (52), for pulse shaping the received signal, whose output is received by a A/D converter (sampler) (a pulse shaping matched filter)
- An adjustable gain preamplifier (105) (a scaler)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the receiver as taught by the combination of Mobin et al. and Webster et al. to include a pulse shaping matched filter as taught by Cahill in order to maximize the signal to noise ratio of the signal before the sampler that samples the received TDMA signal and to include the output of the adaptive frequency correction subunit to be received by an adjustable gain amplifier as taught by Cahill in order to prevent clipping or distortion of the signal before the output is supplied to the match filter.

The combination of Mobin et al., Webster et al. and Cahill teach a receiver that covers substantially all limitations of the claim.

The combination of Mobin et al., Webster et al. and Cahill do not teach an interpolation filter whose output is received by a pulse shaping matched filter.

In Figure 1, Kang teaches an interpolation filter (120) whose output is received by a pulse shaping matched filter (140). (claim 16 – an interpolation filter to which the TDMA signals are applied)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the receiver as taught by the combination of Mobin et al. and Webster et al. and Cahill to include an interpolation filter before the pulse shaping matched filter as taught by Kang in order to up sample the received signal at a rate that allows the pulse shaping match filter to maximize the signal to noise ratio.

8. Claim 2 and 5-6, 18, 21-22, 34, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mobin et al. (US 6522696) in view of Webster et al. (US 6233273), as applied to the parent claims, and further in view of Wright et al. (US 5309482)

- In reference to claims 2 and 5-6, 18, 21-22, 34, 35

The combination of Mobin et al. and Webster et al. teaches a receiver that covers substantially all limitations of the claims.

The combination of Mobin et al. and Webster et al. do not teach a Nyquist filter used to up sample the received signal.

Wright et al. teaches a method where a matched and pulse-shaping filters work together as a Nyquist filter (Nyquist filter) used for up sampling the received signal and to reduce intersymbol interference. (Figure 2, abstract, column 1 lines 10-16) (Nyquist

filter up samples the received TDMA signal and performs the functions of a Nyquist filter)

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the receiver as taught by the combination of Mobin et al. and Webster et al. to include a Nyquist filter as taught by Wright et al. in order to up sample the received signal and to reduce intersymbol interference.

Response to Amendment

9. Applicant's arguments with respect to claims 1, 13, 14, and 16 are moot in view of the new ground(s) of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Roberts whose telephone number is (571) 272-3095. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BSR
08/17/2005

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